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The Relationship between Self-Reported Sexually Explicit Media Consumption and Sexual Risk Behaviors Among Men Who Have Sex With Men in China

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Keywords:	sexually explicit media, men who have sex with men, sexual risk behaviors, pornography, sexual sensation seeking, HIV-related knowledge
Subject Area:	Epidemiology (including risk factors): male sexual health, Sexual behavior, Pornography
Abstract:	<p>Introduction: Previous studies have indicated that viewing sexually explicit media (SEM) may be associated with sexual risk behaviors among men who have sex with men (MSM). However, most prior research has not explored this association cross-culturally or the potential influence that important covariates may have on the association.</p> <p>Aims: To explore the association between self-reports of viewing SEM depicting various sexual risk behaviors and engagement in sexual risk behaviors after controlling for relevant covariates among MSM in China.</p> <p>Methods: Three hundred and fourteen Chinese MSM participated in a web-based survey.</p> <p>Main Outcome Measures: The main outcome measures were SEM consumption, sexual risk behavior, and measures of covariates.</p> <p>Results: SEM consumption was frequent among MSM in China. Viewing a greater proportion of SEM depicting sexual risk behaviors was associated with a higher number of regular partners with whom MSM reported they had engaged in sexual risk behaviors, but not with number of casual partners, after controlling for covariates. HIV-related knowledge and male sex partner-seeking was associated with the number of regular partners with whom MSM had engaged in sexual risk behaviors. Sexual sensation seeking, HIV-related knowledge, and male sex partner-seeking was associated with the number of casual partners with whom MSM had engaged in sexual risk behaviors.</p> <p>Conclusion: Future research exploring the relationship between SEM use and sexual health risk behaviors should take into consideration theoretically important psychological and behavioral covariates.</p>

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The Relationship between Self-Reported Sexually Explicit Media Consumption and Sexual
Risk Behaviors Among Men Who Have Sex With Men in China

ABSTRACT

Introduction: Previous studies have indicated that viewing sexually explicit media (SEM) may be associated with sexual risk behaviors among men who have sex with men (MSM). However, most prior research has not explored this association cross-culturally or the potential influence that important covariates may have on the association.

Aims: To explore the association between self-reports of viewing SEM depicting various sexual risk behaviors and engagement in sexual risk behaviors after controlling for relevant covariates among MSM in China.

Methods: Three hundred and fourteen Chinese MSM participated in a web-based survey.

Main Outcome Measures: The main outcome measures were SEM consumption, sexual risk behavior, and measures of covariates.

Results: SEM consumption was frequent among MSM in China. Viewing a greater proportion of SEM depicting sexual risk behaviors was associated with a higher number of regular partners with whom MSM reported they had engaged in sexual risk behaviors, but not with number of casual partners, after controlling for covariates. HIV-related knowledge and male sex partner-seeking was associated with the number of regular partners with whom MSM had engaged in sexual risk behaviors. Sexual sensation seeking, HIV-related knowledge, and male sex partner-seeking was associated with the number of casual partners with whom MSM had engaged in sexual risk behaviors.

Conclusion: Future research exploring the relationship between SEM use and sexual health risk behaviors should take into consideration theoretically important psychological and behavioral covariates.

Keywords: sexually explicit media; pornography; men who have sex with men; sexual risk behaviors; sexual sensation seeking; HIV-related knowledge; China

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INTRODUCTION

Meta-analyses indicate that the prevalence of HIV among men who have sex with men (MSM) in China is substantial, with an estimated prevalence ranging from 2.5% to 5.3% and increasing¹⁻⁵. Further research suggests that unprotected anal intercourse (UAI) is a major risk factor for HIV infection among MSM and that the prevalence of UAI among MSM is high in China (e.g., the estimated prevalence of UAI was 50% in 2008-2012)^{6,7,8,9}. Further studies are needed to explore the factors associated with UAI, and other sexual risk behaviours, among MSM in China, in order to better target behavioral prevention strategies.

Prior studies have revealed many factors associated with UAI among MSM in China, including the venues where MSM meet sex partners, substance use, number of sex partners, levels of impulsivity, education, and intentions to use condoms¹⁰⁻¹³. However, the potential association of another factor, sexually explicit media (SEM) consumption, with sexual risk behaviors among MSM in China has never before been examined. This will be explored in the current study for the first time.

SEM Consumption Among MSM

In China, sex education in schools on topics considered socially taboo (e.g., sexuality, HIV, and same-sex sexual orientation) is very limited¹⁴. Research also indicates that very few parents provide education or knowledge about sex¹⁵. Thus, same-sex attracted men or MSM may seek out alternative sources of sexual information, including SEM. Although no studies have explored the SEM consumption among MSM in China, prior studies have indicated that the SEM consumption is common and frequent among MSM in Western countries^{16,17}. Thus, it is possible that the SEM consumption is also frequent among MSM in China.

SEM Consumption and Sexual Risk Behaviors Among MSM

Viewing SEM may have positive influences upon the sexual health of MSM^{18,19}. For example, viewing SEM may aid in the learning of performing same-sex sex^{20,21}; promote self-recognition of same-sex attractions^{20,22}; and clarify sexual self-labels²³. However, SEM depicting male same-sex acts often contain several potentially risky sexual behaviors known to be associated with STI risk, including UAI, ejaculation in the mouth (EM), and ejaculation in/on or rubbed into the anus (EA)²⁴. Some studies have indicated that viewing SEM is associated with sexual risk behaviors among MSM^{25,26}. Naturally, without the benefit of longitudinal designs such studies (including the present study) cannot test for causality and necessarily rely on self-report. However, cross-sectional survey studies can help to clarify definitions of the relevant factors (e.g., SEM use) and lend plausibility to hypotheses regarding the origins of the association between SEM and sexual risk behavior. Cross-sectional survey methods are also often the only way to access under-represented or sexual minority populations, especially in cultural contexts where certain sexual behaviors or sexual identities are highly stigmatized (e.g., China). Critically, they can guide future prospective empirical work by identifying the kinds of factors that might be important to focus on.

It is important to note many prior studies have yielded inconsistent results. Some studies failed to reveal an association between SEM consumption and safer sex practice beliefs or interests in having UAI^{27,28}. One study reported that more attention or exposure to condomless SEM was associated with reduced safe-sex intentions²⁹. Another study has also observed a marginal association between condomless SEM consumption and engaging in UAI among MSM who viewed SEM more than an hour per day¹⁶. A number of studies have also revealed

that greater SEM consumption was associated with greater odds of engaging in UAI^{26, 30-33} or serodiscordant UAI²⁵, having more male sexual partners³⁴, and more interest in group sex³⁵.

Limitations of Prior Research

A number of limitations of the prior research require comment. Although several studies used the total time spent viewing SEM as a measure of SEM consumption, they did not differentiate the time spent viewing SEM depicting safer sexual behaviors (e.g., anal sex with condom) versus sexual risk behaviors (e.g., UAI)^{27,28}. For example, compared to MSM who viewed SEM depicting safe-sex or conventional sex, MSM who watched a greater range of sex acts tended to specifically view UAI more frequently, have greater SEM consumption, and lower condom use self-efficacy³⁶. Thus, individuals with the same SEM viewing times may view SEM depicting diverse sexual behaviors. Research has also suggested that total time spent viewing SEM was not associated with engagement in sexual risk behaviors. Instead, viewing a greater proportion of SEM depicting UAI was associated with engagement in more UAI^{16, 30}. Thus, it may be important to make a distinction between the times spent viewing SEM depicting safer sexual behaviors and SEM depicting sexual risk behaviors. Prior studies also tend to focus UAI as either the sexual risk behavior or the behavior of interest as depicted in the SEM^{25,26}. However, SEM depicting male same-sex acts often contain several potentially high-risk sexual behaviors including exchange of semen, ejaculation in the mouth (EM) and ejaculation on or around the anus (EA) which require further study²⁴.

Almost all the prior studies have focused on ethnically White men. Given the potential implications for global sexual health among MSM, especially those from developing nations, the association between SEM consumption and sexual risk behavior should also be tested in

1
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3 non-western samples. Replication of the hypothesized associations in such samples lends
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6 plausibility to the proposed mechanisms underlying any associations in Western samples.
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9 Previous research has mainly focused on UAI with casual partners^{16,27} or does not
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11 differentiate UAI with regular partners from UAI with casual partners^{30,31}. Research has
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13 suggested that UAI with regular partners occurred frequently among MSM^{37,38}. Findings from
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15 MSM in five U.S. cities estimate that 68% of HIV transmissions were from regular partners³⁹.
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17 A meta-analysis has also revealed that the estimated prevalence of UAI with regular male
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19 partners is 45% among MSM in China⁹. Thus, examining reports of UAI with regular partners
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21 is important for further research.
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26 Finally, most prior research has not explored the potential influence that relevant covariates
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28 (e.g., those reviewed above) have on the association between SEM consumption and sexual
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30 risk behaviors. Condom use self-efficacy (CUSE) may be an important mediating factor^{32,33},
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32 but the role of other covariates, including the degree of sexual arousal when viewing SEM,
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34 sociosexual orientation (SOI), sexual sensation seeking (SSS), Internalized Homophobia (IH),
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36 HIV-related knowledge, and male sex partners-seeking, is poorly studied. Sexual arousal may
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38 be an important covariate because prior research indicates that MSM who find the SEM
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40 depicting various sexual risk behaviors sexually arousing may be more likely to engage in the
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42 subsequent sexual risk behaviors than MSM who are not as sexually aroused⁴⁰.
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49 SOI is a trait which refers to individuals' overall preference for short-term or uncommitted
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51 sexual relationships⁴¹. One study in China has reported that SOI behavior and desire sub-scale
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53 scores were associated with online sexual activity (including SEM viewing)⁴². Other studies
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55 have reported that unrestricted sociosexuality was associated with a greater odds of
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engagement in unprotected sexual intercourse⁴³ and greater number lifetime sex partners^{44,45}. Importantly, these relationships have been reported in studies focusing on heterosexual individuals and not MSM.

SSS is defined as “the propensity to attain optimal levels of sexual excitement and to engage in novel sexual experiences”⁴⁶. Prior research has suggested that exposure to SEM may increase levels of SSS, thereby promoting sexual risk behaviors⁴⁷. Research has also speculated that it is possible that greater SSS may increase SEM consumption, thereby associating with more sexual risk behaviors⁴⁸. Studies appear to indicate that higher IH is associated with engagement in more sexual risk behaviors, although the evidence is somewhat mixed^{49,50}. Research has also found that lower level of HIV-related knowledge and more male sex partners-seeking behaviour was associated with engagement in more sexual risk behaviors among MSM^{13,51}. However, no studies have explored the potential influences of SSS, IH, and male sex partner-seeking on the association between SEM consumption and sexual risk behavior among MSM.

Aims

The objectives of the current study were to explore the association between self-reports of viewing SEM depicting various sexual risk behaviors and engagement in subsequent sexual risk behaviors after controlling for potentially important covariates (outlined above) among MSM in China. We hypothesized that the SEM consumption would be very frequent, and viewing SEM depicting various sexual risk behaviors would be associated with reported sexual risk behaviors even after controlling for covariates among MSM in China.

METHODS

Participants

All study procedures were approved by the ethics committee of a local university prior to data collection, and informed consent was obtained from all participants. Data were collected via a web-based survey hosted by Wenjuanxing (a Chinese survey website). Participants were recruited via notices placed on Chinese web sites that serve MSM individuals, including MSM forums and chat rooms. Participants were required to complete a questionnaire which comprised the measures of sexual orientation, SEM consumption, sexual risk behavior, covariates, and demographic information. A total of 420 participants initially responded to the questionnaire. However, participants were only eligible if they identified as male and reported ever having had sex with men. Thus, the final sample consisted of 314 Chinese MSM from 29 provinces/regions of China. Table 1 presents the demographic information of the participants. The mean age of this sample was 25.46 years ($SD = 6.46$ years), ranging from 15 to 56 years. Participants identified primarily as Han Chinese (94.27%), single (57.64%), reported a college education or higher (84.72%), and self-identified as homosexual or bisexual men (97.45%).

Measures

Sexual Orientation

Sexual orientation was measured by three items pertaining to sexual attraction, sexual behavior, and sexual identity on a 7-point Kinsey-like scale. Participants were asked the gender they felt sexually attracted to (0 = exclusively opposite-sex; 6 = exclusively same-sex) and the gender of their lifetime sexual partners (0 = exclusively opposite-sex; 6 = exclusively same-sex; 7 = no sexual experience), and their general sexual identification to the question: "What is your sexual orientation" (0 = exclusively heterosexual; 6 = exclusively homosexual).

SEM Consumption

SEM consumption was measured by three subscales pertaining to the duration of viewing SEM, the proportion of SEM they viewed that depicted various sexual behaviors, and the degree of sexual arousal when viewing SEM depicting various sexual behaviors. Participants were asked to choose the duration they spent viewing SEM in a typical week during the last 3 months on a 5-point scale: 1= 0 minutes; 2 = between 1 minute and 1 hour; 3 = between 1 hour and 3.5 hours; 4 = between 3.5 hours and 7 hours; 5 = more than 7 hours (as used by²⁶). Participants were also asked to choose the proportion of SEM they viewed that depicted UAI, EM, and EA on a 5-point scale: 1 = none, 2 = 1-24%, 3 = 25-49%, 4 = 50-74%, 5 = 75-100%³⁰. Finally, participants were asked to report their degree of sexual arousal when viewing SEM depicting UAI, EM, and EA by one item “How sexually aroused do you feel? ” on a 7-point Likert-type scale (0 = no arousal at all; 6 = extremely sexually aroused). The one-item scale used in the present study is similar to those used and validated in previous studies on subjectively reported sexual arousal^{52,53}.

Sexual Risk Behavior

Participants were asked to provide the number of regular (identified as “boyfriend” or “lover”) and casual male sex partners in the last three months with whom they had engaged in insertive UAI (UAI-I), receptive UAI (UAI-R), insertive EM (EM-I), receptive EM (EM-R), insertive EA (EA-I), and receptive EA (EA-R).

SOI.

SOI was assessed via the Revised Sociosexual Orientation Inventory⁴¹. The scale has 9 items that examine past sexual behavior experiences, attitude towards uncommitted sex, and desire

for casual or uncommitted sex. Studies have provided evidence for the validity of the scale's construct⁴¹. An example item is "I can imagine myself being comfortable and enjoying "casual" sex with different partners". Items were rated on a 9-point scale. The Chinese version of the SOI scale used here was translated from the original and back-translated. The Cronbach's alphas of the three sub-scales in the present sample were 0.83, 0.65, and 0.89 respectively.

SSS

SSS was measured via the Sexual Sensation Seeking scale⁵⁴. This scale has 11 items that measures an individual's propensity to seek sexual excitement and to engage in novel sexual experiences. Studies have provided evidence for the validity of the scale's construct⁵⁴. An example item is "I am interested in trying out new sexual experiences". Items were rated on a 4-point scale (1= not at all like me; 4 = very much like me). The Chinese version of the SSS scale used here was translated from the original and back-translated. The Cronbach's alpha of the scale in the present sample was 0.88.

CUSE.

CUSE was measured via the Condom Use Self-Efficacy Scale⁵⁵. This scale has 15 items that measure individuals' confidence in their capacity to use a condom in various situations. Studies have provided evidence for the validity of the scale's construct^{55,56}. An example item is "I feel confident in my ability to suggest using condoms with a new partner". Items were rated on a 5-point scale (1= strongly disagree; 5 = strongly agree). The Chinese version of the CUSE scale used here was translated from the original and back-translated. The Cronbach's alpha of the scale in the present sample was 0.90

IH.

IH was measured via the Internalized Homophobia scale⁵⁷. This scale has 9 items that measures gay men’s dissatisfaction with their same-sex sexual orientation and desire to avoid it. Studies have provided evidence for the validity of the scale’s psychometric properties^{58,59}. An example item is “I tried to become more sexually attracted to women”. Items were rated on a 5-point scale (1= strongly disagree; 5 = strongly agree). The Chinese version of the IH scale used here was translated from the original and back-translated. The Cronbach’s alpha of the scale in the present sample was 0.90.

HIV-Related Knowledge

HIV-related knowledge was assessed via 5 questions adopted from prior study⁶⁰. An example item is “Can using condoms reduce the risk of HIV transmission?” Participants were asked to choose from “Yes”, “No”, and “Don’t Know” in reply to 5 questions. For each questions, response was classified as 1 (correct answer) or 0 (incorrect answer or unknown). The scale for HIV-related knowledge was constructed as a sum of all 5 questions with a total score ranging from 0 to 5.

Perceived Risk of HIV Infection

Perceived risk of HIV infection was assessed via one question adopted from a prior study: “What is the possibility for you to catch HIV?”⁶¹. Items were rated on a 4-point scale (1= completely impossible; 4 = vey possible).

Male Sex Partners-Seeking

Participants were asked to choose the frequency of using 5 kinds of venues for finding male sex partners on a 9-point scale: 1= never; 2 = very seldom; 3 = about once every two or three

months; 4 = about once a month; 5 = about once every two weeks; 6 = about once a week; 7 = several times per week; 8 = nearly every day; 9 = at least once a day, separately. Five venues included bars/clubs/discos/tearooms; bathhouses/saunas/massage parlors; parks/other public areas; Internet sites; others¹³. The scale for male sex partners-seeking was constructed as an average of all 5 questions with a mean score ranging from 0 to 9.

Demographic Information

Demographic information included participants' gender, age, education level (junior high school or less, senior high school, college, or postgraduate or higher), ethnicity (Han or the ethnic minorities), province of residence, HIV status (negative, positive, or unknown), and current relationship status (single and not dating, single and dating more than one person, in a relationship with a duration less than 3 months, in a relationship with a duration between 3 and 6 months, in a relationship with a duration between 6 and 12 months, in a relationship with a duration between 1 and 5 years, or in a relationship with a duration longer than 5 years).

Data transformation

We created a composite sexual risk behavior outcome variable separately by partner type (regular partners and casual partners). This included the number of sexual partners and sexual risk behavior type (e.g., UAI, EM, EA). These were standardized within-participants using z-scores. The composite sexual risk behavior outcome variable was computed by adding those z-scores within-participants. We also created a composite proportion of SEM viewed (depicting the different sexual risk behaviors) as a predictor. The proportion of SEM viewed separately by sexual risk behavior type were standardized within-participants using z-scores. Then a composite proportion of SEM viewed was computed by adding those z-scores

within-participants. The same method was used to compute a composite sexual arousal when viewing SEM depicting the different sexual risk behaviors. The Tables show the untransformed data for the purposes of clarity for the reader

Data Analysis

A three-step hierarchical multiple regression was used to examine the relative importance of predictors entered in step three to predictors entered in step one and two, and to explore whether there were significant associations between predictors entered in step three and dependent variable after controlling for the covariates entered in previous steps⁶². This allowed us to test the associations between self-reports of viewing SEM depicting various sexual risk behaviors and engagement in sexual risk behaviors separately by partner type. This resulted in 2 different regression models(one for regular partner and one for casual partner). The multiple regressions used composite sexual risk behavior index as the dependent variable. In the first step, covariates including age, HIV status, ethnicity, education, the degree of sexual arousal when viewing SEM, SSS, IH, CUSE, SOI, perceived risk of HIV infection, HIV-related knowledge, and male sex partners-seeking were entered. In the second step, the time they spent viewing SEM was entered. In the third step, the composite proportion of SEM participants viewed that depicted sexual risk behaviors was entered.

RESULTS

SEM Consumption

Table 2 presents the SEM consumption. The majority of participants reported having viewed SEM (93.63%), SEM that depicted UAI (80.89%), SEM that depicted EM (80.25%), and SEM that depicted EA (83.76%) in the last three months

Associations between SEM Consumption and Sexual Risk Behaviors

Table 3 presents mean (*SD*) of partners (regular versus casual) with whom participants engaged in different sexual risk behavior types. Table 4 presents the results of the hierarchical multiple regressions for regular partners. The analysis revealed that HIV-related knowledge and male sex partners-seeking was significantly associated with the number of regular partners with whom MSM had engaged in sexual risk behaviors. Time spent viewing SEM was not a significant predictor. The proportion of SEM viewed depicting sexual risk behaviours was significantly associated with the number of regular partners with whom MSM had engaged in sexual risk behaviors after controlling for covariates. The proportion of SEM viewed accounted for a small amount of the variance ($R^2_{\text{change}} = 0.10$).

Table 4 also presents the results of the hierarchical multiple regressions for casual partners. The analysis revealed that SSS, HIV-related knowledge, and male sex partners-seeking was significantly associated with the number of casual partners with whom MSM had engaged in sexual risk behaviors. Neither time spent viewing SEM nor the proportion of SEM viewed depicting sexual risk behaviors after controlling for covariates was a significant predictor.

DISCUSSION

The current study produced three tentative findings. First, SEM consumption is frequent among MSM in China. Second, viewing SEM depicting sexual risk behaviors was associated, to a small degree, with engagement in sexual risk behaviors with regular partners after controlling for a number of important covariates. Third, viewing SEM depicting sexual risk behaviors was not associated with engagement in sexual risk behaviors with casual partners after controlling for covariates.

We found that the majority of participants (93.63%) reported having viewed SEM and 46.81% of them reported having spent more than one hour per week viewing SEM in the last 3 months. This result suggests that the SEM consumption is common and frequent among MSM in China. Not only does this result support the findings of previous research, but it also extends those findings to a Chinese MSM sample for the first time^{16,17}.

The results showed that viewing a greater proportion of SEM depicting sexual risk behaviors was associated with a higher number of regular partners with whom MSM had engaged in sexual risk behaviors after controlling for covariates. However, the total time MSM spent viewing SEM was not a significant predictor. This result further indicates that it is the proportion of SEM depicting sexual risk behaviors MSM viewed instead of total time spent viewing SEM that appears to be important, consistent with prior studies^{16,30}.

Although the cross-sectional design of the current study clearly precludes any comment on causation, or the chronology of the association between SEM consumption and engagement sexual risk behaviors, several theories have been offered to explain the relationship. Some researchers have suggested that viewing SEM depicting sexual risk behaviors may lead MSM to perceive that engagement in sexual risk behaviors is common and acceptable, which then may increase their possibility of initiation and engagement in corresponding sexual risk behaviors¹⁹. Alternatively, others suggest that MSM may choose to view SEM depicting certain sexual risk behaviors because they already have a preference for those behaviors or have previously initiated the corresponding sexual behaviors²⁶.

It is important to note that viewing SEM depicting sexual risk behaviors accounted for only a small portion of the variance, after controlling for covariates ($R^2_{\text{change}} = 0.008-0.10$). This

suggests that other factors must contribute to engagement in sexual risk behaviors among MSM and those factors loom much larger than SEM consumption.

Although the variance in sexual risk behaviors explained by SEM consumption was small, the potential influence of SEM consumption on engagement in sexual risk behaviors should not be interpreted as unimportant. Prior research suggests that the association between SEM consumption and engagement in sexual risk behaviors may be mediated by other factors (e.g., CUSE) and the interaction of these factors may have strong predictive utility⁴⁸. This is important as some explanations have posited that “third variables” may mediate between SEM use and sexual risk behaviors, including personality or trait-based factors (such as sensation-seeking or SOI). The results of our study also suggest that future research consider partner type. Research has suggested that whether MSM adopt new sexual risk behaviors viewed in SEM may also depend on duration and trust in a partnership⁴⁰. The trust between MSM and their regular partners may be strengthened with the duration of the relationship and cascade into engagement in sexual risk behaviors with a regular partner due to familiarity, trust, perceived lower risk, or overconfidence in managing risk behaviors. This may explain the association between viewing SEM depicting sexual risk behaviors and engagement in sexual risk behaviors with regular partners, but not with casual partners, reported here. Some MSM in the current sample who were in a relationship also reported having engaged in sexual risk behaviors with casual partners. For example, 30 (23.43%) MSM who were in a relationship reported having engaged in receptive UAI with casual partners. Those MSM may have higher risk for acquiring STIs and may pass STIs to their regular partners. Thus, engaging in sexual risk behaviors with regular partners may also pose potential threats to the health of MSM.

By contrast, the multiple regressions revealed that SSS and HIV-related knowledge was significantly associated with the number of casual partners with whom MSM had engaged in sexual risk behaviors. Prior work has theorised that exposure to SEM may increase levels of SSS, thereby promoting sexual risk behaviors³⁷. It is possible that greater SSS may increase SEM consumption, thereby associating with more sexual risk behaviors³⁸. MSM who have the knowledge about HIV prevention may have a better understanding about the risks of sexual risk behaviors, which may prevent them from engaging in sexual risk behaviors.

The current study had several important limitations. First, the cross-sectional design of the current study precludes the determination of causal association and the chronology of SEM consumption and engagement in sexual risk behaviors. Second, the convenience sample used in this study was recruited via the Internet, and the sample size was small. Importantly, individuals who use the Internet may not necessarily be representative of all MSM, especially in a cultural context with high levels of social stigma against sexual minorities. Thus, the results may not easily be generalizable to the population at large or MSM who did not use Internet. Third, we relied on self- report methods, which may be subject to social desirability and recall bias. Fourth, the variation of the number of regular or casual partners with whom participants reported to engage in sexual risk behaviors was limited, causing range restriction.

Future studies should address these limitations, in order to ascertain whether the results presented herein can be replicated in similar populations, as well as across different socio-cultural groups.

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REFERENCES

1
2
3
4 1. Chow EP, Wilson DP, Zhang J, et al. Human immunodeficiency virus prevalence is
5
6 increasing among men who have sex with men in China: Findings from a review and
7
8 meta-analysis. *Sex Transm Dis* 2011; 38: 845–857.
9
10
11 2. Chow EP, Wilson DP, Zhang L. HIV and syphilis co-infection increasing among men who
12
13 have sex with men in China: A systematic review and meta-analysis. *PloS One* 2011; 6:
14
15 e22768.
16
17
18 3. Gao L, Zhang L, Jin Q. Meta-analysis: Prevalence of HIV infection and syphilis among
19
20 MSM in China. *Sex Transm Infec* 2009; 85: 354–358.
21
22
23 4. Li HM, Peng RR, Li J, et al. HIV incidence among men who have sex with men in China: A
24
25 meta-analysis of published studies. *PloS One* 2011; 6: e23431.
26
27
28 5. Wu Z, Xu J, Liu E, et al. HIV and syphilis prevalence among men who have sex with men: A
29
30 cross-sectional survey of 61 cities in China. *Clin Infect Dis* 2013; 57: 298–309.
31
32
33 6. Beyrer C, Baral SD, van Griensven F, et al. Global epidemiology of HIV infection in men
34
35 who have sex with men. *Lancet* 2012; 380: 367–377.
36
37
38 7. Koblin BA, Husnik MJ, Colfax G, et al. Risk factors for HIV infection among men who have
39
40 sex with men. *AIDS* 2006; 20: 731–739.
41
42
43 8. Guo Y, Li X, Stanton B. HIV-related behavioral studies of men who have sex with men in
44
45 China: A systematic review and recommendations for future research. *AIDS Behav* 2011;
46
47 15: 521–534.
48
49
50 9. Wu J, Hu Y, Jia Y, et al. Prevalence of unprotected anal intercourse among men who have
51
52 sex with men in China: An updated meta-analysis. *PloS One* 2014; 9: e98366.
53
54
55
56
57
58
59
60

10. Cai Y, Lau JT. Multi-dimensional factors associated with unprotected anal intercourse with regular partners among Chinese men who have sex with men in Hong Kong: A respondent-driven sampling survey. *BMC Infect Dis* 2013; 14: 205–205.
11. Cheng W, Tang W, Zhong F, et al. Consistently high unprotected anal intercourse (UAI) and factors correlated with UAI among men who have sex with men: Implication of a serial cross-sectional study in Guangzhou, China. *BMC Infect Dis* 2013; 14: 696–696.
12. Chow EP, Chen X, Zhao J, et al. Factors associated with self-reported unprotected anal intercourse among men who have sex with men in Changsha city of Hunan province, China. *AIDS Care* 2015; 27: 1332–1342.
13. Tang W, Huan X, Mahapatra T, et al. Factors associated with unprotected anal intercourse among men who have sex with men: results from a respondent driven sampling survey in Nanjing, China, 2008. *AIDS Behav* 2013; 17: 1415–1422.
14. Zhang L, Li X, Shah IH. Where do Chinese adolescents obtain knowledge of sex? Implications for sex education in China. *Health Educ* 2007; 107: 351–363.
15. Liu W, Van Campen KS, Edwards CP, et al. Chinese parents' perspectives on adolescent sexuality education. *Int J Sex Health* 2011; 23: 224–236.
16. Rosser BS, Smolenski DJ, Erickson D, et al. The effects of gay sexually explicit media on the HIV risk behavior of men who have sex with men. *AIDS Behav* 2013; 17: 1488–1498.
17. Traeen B, Nilson TS. Use of pornography in traditional media and on the Internet in Norway. *J Sex Res* 2006; 43: 245–254.

1
2
3
4 18. Hald GM, Træen B, Noor SW, et al. Does sexually explicit media (SEM) affect me?
5
6 Assessing first-person effects of SEM consumption among Norwegian men who have sex
7
8 with men. *Psychol Sex* 2015; 6: 59–74.
9
10
11 19. Nelson KM, Leickly E, Yang JP, et al. The influence of sexually explicit online media on
12
13 sex: do men who have sex with men believe they "do what they see"? *AIDS Care* 2014; 26:
14
15 931–934.
16
17
18 20. Kubicek K, Beyer WJ, Weiss G, et al. In the dark: Young men's stories of sexual initiation
19
20 in the absence of relevant sexual health information. *Health Educ Behav* 2010; 37:
21
22 243–263.
23
24
25 21. Kubicek K, Carpineto J, McDavitt B, et al. Use and perceptions of the Internet for sexual
26
27 information and partners: a study of young men who have sex with men. *Arch Sex Behav*
28
29 2011; 40: 803–816.
30
31
32 22. Mustanski B, Lyons T, Garcia SC. Internet use and sexual health of young men who have
33
34 sex with men: A mixed-methods study. *Arch Sex Behav* 2011; 40: 289–300.
35
36
37 23. Arrington-Sanders R, Harper GW, Morgan A, et al. The role of sexually explicit material in
38
39 the sexual development of same-sex-attracted Black adolescent males. *Arch Sex*
40
41
42
43
44 Behav 2015; 44: 597–608.
45
46 24. Downing Jr MJ, Schrimshaw EW, Antebi N, et al. Sexually explicit media on the Internet:
47
48 A content analysis of sexual behaviors, risk, and media characteristics in gay male adult
49
50
51
52
53
54
55
56
57
58
59
60

25. Nelson KM, Simoni JM, Morrison DM, et al. Sexually explicit online media and sexual risk among men who have sex with men in the United States. *Arch Sex Behav* 2014; 43: 833–843.
26. Træen B, Noor SW, Hald GM, et al. Examining the relationship between use of sexually explicit media and sexual risk behavior in a sample of men who have sex with men in Norway. *Scand J Psychol* 2015; 56: 290–296.
27. Hald GM, Smolenski D, Rosser BR. Perceived effects of sexually explicit media among men who have sex with men and psychometric properties of the Pornography Consumption Effects Scale (PCES). *J Sex Med* 2013; 10: 757–767.
28. Morrison TG, Morrison MA, Bradley BA. Correlates of gay men's self-reported exposure to pornography. *Int J Sex Health* 2007; 19: 33–43.
29. Jonas KJ, Hawk ST, Vastenburg D, et al. “Bareback” pornography consumption and safe-sex intentions of men having sex with men. *Arch Sex Behav* 2014; 43: 745–753.
30. Schrimshaw EW, Antebi-Gruszka N, Downing Jr MJ. Viewing of Internet-based sexually explicit media as a risk factor for condomless anal sex among men who have sex with men in four US cities. *PloS One* 2016; 11: e0154439.
31. Stein D, Silvera R, Hagerty R, et al. Viewing pornography depicting unprotected anal intercourse: Are there implications for HIV prevention among men who have sex with men? *Arch Sex Behav* 2012; 41: 411–419.
32. Træen B, Hald GM, Noor SW, et al. The relationship between use of sexually explicit media and sexual risk behavior in men who have sex with men: Exploring the mediating

1
2
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52
53
54
55
56
57
58
59
60

effects of sexual self-esteem and condom use self-efficacy. *Int J Sex Health* 2014; 26: 13–24.

33. Træen B, Noor SW, Grey J, et al. Sexually explicit media and sexual risk behavior in a sample of men who have sex with men in Norway. *Sex Cult* 2014; 18: 1038–1051.

34. Eaton LA, Cain DN, Pope H, et al. The relationship between pornography use and sexual behaviours among at-risk HIV-negative men who have sex with men. *Sex Health* 2012; 9: 166–170.

35. Weinberg MS, Williams CJ, Kleiner S, et al. Pornography, normalization, and empowerment. *Arch Sex Behav* 2010; 39: 1389–1401.

36. Erickson DJ, Galos DL, Smolenski DJ, et al. Typologies of sexually explicit media use among MSM: An application of latent class analysis. *Psychol Sex* 2015; 6: 28–43.

37. Mitchell JW, Harvey SM, Champeau D, et al. Relationship factors associated with HIV risk among a sample of gay male couples. *AIDS Behav* 2012; 16: 404–411.

38. Newcomb ME, Ryan DT, Garofalo R, et al. The effects of sexual partnership and relationship characteristics on three sexual risk variables in young men who have sex with men. *Arch Sex Behav* 2014; 43: 61–72.

39. Sullivan PS, Salazar L, Buchbinder S, et al. Estimating the proportion of HIV transmissions from main sex partners among men who have sex with men in five US cities. *AIDS* 2009; 23: 1153–1162.

40. Wilkerson JM, Iantaffi A, Smolenski DJ, et al. The SEM risk behavior (SRB) model: A new conceptual model of how pornography influences the sexual intentions and HIV risk behavior of MSM. *Sex Relation Ther* 2012; 27: 217–230.

41. Penke L, Asendorpf JB. Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *J Pers Soc Psychol* 2008; 95: 1113–1135.
42. Zheng L, Zheng, Y. Online sexual activity in Mainland China: Relationship to sexual sensation seeking and sociosexuality. *Comput Human Behav* 2014; 36: 323–329.
43. Seal DW, Agostinelli G. Individual differences associated with high-risk sexual behaviour: Implications for intervention programmes. *AIDS Care* 1994; 6: 393–397.
44. Ostovich JM, Sabini J. How are sociosexuality, sex drive, and lifetime number of sexual partners related? *Pers Soc Psychol Bull* 2004; 30: 1255–1266.
45. Yost MR, Zurbriggen EL. Gender differences in the enactment of sociosexuality: An examination of implicit social motives, sexual fantasies, coercive sexual attitudes, and aggressive sexual behavior. *J Sex Res* 2006; 43: 163–173.
46. Kalichman SC, Johnson JR, Adair V, et al. Sexual sensation seeking: Scale development and predicting AIDS-risk behavior among homosexually active men. *J Pers Assess* 1994; 62: 385–397.
47. O'Hara RE, Gibbons FX, Gerrard M, et al. Greater exposure to sexual content in popular movies predicts earlier sexual debut and increased sexual risk taking. *Psychol Sci* 2013; 23: 984–993.
48. Hald GM, Kuyper L, Adam PC, et al. Does viewing explain doing? Assessing the association between sexually explicit materials use and sexual behaviors in a large sample of Dutch adolescents and young adults. *J Sex Med* 2013; 10: 2986–2995.

49. Newcomb ME, Mustanski B. Moderators of the relationship between internalized homophobia and risky sexual behavior in men who have sex with men: A meta-analysis. *Arch of Sex Behav* 2011; 40: 189-199.

50. Szymanski DM, Kashubeck-West S, Meyer J. Internalized heterosexism measurement, psychosocial correlates, and research directions. *Couns Psychol* 2008; 36: 525-574.

51. Mason K, Ketende S, Peitzmeier S, et al. A cross-sectional analysis of population demographics, HIV knowledge and risk behaviors, and prevalence and associations of HIV among men who have sex with men in the Gambia. *AIDS Res Hum Retroviruses* 2013; 29: 1547-1552.

52. Chivers ML, Seto MC, Blanchard R. Gender and sexual orientation differences in sexual response to sexual activities versus gender of actors in sexual films. *J Pers Soc Psychol* 2007; 93: 1108–1121.

53. Chivers ML, Timmers AD. Effects of gender and relationship context in audio narratives on genital and subjective sexual response in heterosexual women and men. *Arch Sex Behav* 2013; 41: 185–197.

54. Kalichman SC, Rompa D. Sexual sensation seeking and sexual compulsivity scales: Reliability, validity, and predicting HIV risk behavior. *J Pers Assess* 1995; 65: 586–601.

55. Brien TM, Thombs DL, Mahoney CA, et al. Dimensions of self-efficacy among three distinct groups of condom users. *J Am Coll Health* 1994; 42: 167–174.

56. Brafford LJ, Beck KH. Development and validation of a condom self-efficacy scale for college students. *J Am Coll Health* 1991; 39: 219–225.

- 1
2
3
4 57. Herek GM, Cogan JC, Gillis JR, et al. Correlates of internalized homophobia in a
5
6 community sample of lesbians and gay men. *J Gay Lesbian Med Assoc* 1998; 2: 17–25.
7
8
9 58. Meyer IH. Minority stress and mental health in gay men. *J Health Soc Behav* 1995; 36:
10
11 38–56.
12
13
14 59. Meyer IH, Dean L. Internalized homophobia, intimacy, and sexual behavior among gay
15
16 and bisexual men InG M Herek (Ed), *Stigma and sexual orientation: Understanding*
17
18 *prejudice against lesbians, gay men, and bisexuals* (pp 160–186) Thousand Oaks, CA:
19
20 Sage, 1998.
21
22
23 60. Adam PC, de Wit JB, Toskin I, et al. Estimating levels of HIV testing, HIV prevention
24
25 coverage, HIV knowledge, and condom use among men who have sex with men (MSM) in
26
27 low-income and middle-income countries. *J Acquir Immune Defic Syndr* 2009; 52:
28
29 S143–S151.
30
31
32 61. Song Y, Li X, Zhang L, et al. HIV-testing behavior among young migrant men who have
33
34 sex with men (MSM) in Beijing, China. *AIDS Care* 2011; 23: 179–186.
35
36
37
38 62. Cohen BH. *Explaining psychological statistics* (2nd ed.). New York: Wiley, 2001.
39
40
41
42
43
44
45
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Table 1. Demographic information of participants

Participants (n = 314)	
Age (in years)	
Mean (SD)	25.46 (6.46)
Educational level, n (%)	
Junior high school or less	11 (3.50)
Senior high school	37 (11.78)
College	160 (50.96)
Postgraduate or higher	106 (33.76)
Ethnicity, n (%)	
Han	296 (94.27)
Ethnic minority	18 (5.73)
Relationship status, n (%)	
Single and not dating	142 (45.22)
Single but dating	39 (12.42)
In a relationship, <3 months	30 (9.55)
In a relationship, 3 - 6 months	10 (3.18)
In a relationship, 6 - 12 months	22 (7.01)
In a relationship, 1 - 5 years	35 (11.15)
In a relationship, > 5 years	36 (11.47)
Sexual identity ^a , n (%)	
Heterosexual	8 (2.55)
Bisexual	85 (27.07)
Homosexual	221 (70.38)
Sexual attraction ^a , n (%)	
Heterosexual	2 (0.64)
Bisexual	58 (18.47)
Homosexual	254 (80.89)
Sexual behavior ^a , n (%)	
Heterosexual	7 (2.23)
Bisexual	34 (10.83)
Homosexual	273 (86.94)

Note. ^a Those with a score of 0 and 1 were classified as heterosexual, those with a score between 2 and 4 were classified as bisexual, and those with a score of 5 and 6 were classified as homosexual. When sexual orientation was measured via sexual behavior, individuals without any same-sex sexual experiences were excluded from analyses (n = 65).

Table 2. Self-reported SEM consumption

	Participants (n = 314), n (%)
SEM consumption (hr/week)	
0	20 (6.37)
< 1	147 (46.82)
1- <3.5	91 (28.98)
3.5- <7	32 (10.19)
>=7	24 (7.64)
SEM consumption that depicted UAI	
0	60 (19.11)
1-24%	94 (29.93)
25-49%	61 (19.43)
50-74%	42 (13.38)
75-100%	57 (18.15)
SEM consumption that depicted EM	
0	62 (19.75)
1-24%	97 (30.89)
25-49%	57 (18.15)
50-74%	48 (15.29)
75-100%	50 (15.92)
SEM consumption that depicted EA	
0	51 (16.24)
1-24%	72 (22.93)
25-49%	63 (20.06)
50-74%	56 (17.84)
75-100%	72 (22.93)

Table 3. Mean (SD) of partners (regular versus casual) with whom participants engaged in different sexual risk behavior types.

Partner type	Sexual risk behavior type					
	UAI-I	UAI-R	EM-I	EM-R	EA-I	EA-R
Regular partner	1.52 (1.18)	1.54 (1.27)	1.62 (1.37)	1.53 (1.34)	1.59 (1.41)	1.42 (1.19)
Causal partner	1.30 (0.93)	1.42 (1.08)	1.34 (0.81)	1.39 (1.11)	1.39 (1.07)	1.33 (1.04)

Table 4. Regression models for demographic factors, covariates, and SEM consumption variables predicting number of sexual partners with whom participants engaged in sexual risk behaviors (separately by partner type)

	Sexual partner type					
	Number of Regular partners			Number of Casual partners		
	R^2	B	t	R^2	B	t
Step 1	.195			.315		
Age		0.05	1.43		0.04	1.02
HIV status		0.06	0.12		0.05	0.09
Ethnicity		0.41	0.47		-0.01	-0.02
Education		-0.42	-1.50		-0.46	-1.53
Sexual arousal		0.11	1.15		0.01	0.05
SSS		0.79	1.76		1.30	2.66**
IH		0.24	1.07		0.00	0.00
CUSE		-0.52	-1.51		-0.58	-1.55
SOI-sexual behavior		0.17	1.35		0.25	1.90
SOI-sexual attitude		0.09	0.71		0.11	0.79
SOI-sexual desire		-0.16	-1.46		-0.17	-1.40
Perceived risk of HIV infection		-0.36	-1.35		-0.31	-1.05
HIV-related knowledge		-2.38	-1.97*		-4.39	-3.35***
Male sex partners-seeking		0.95	3.77***		1.60	5.87***
Step 2	.195			.315		
Time spent viewing SEM		0.04	0.20		0.03	0.12
Step 3	.205			.323		
Proportion of SEM depicting sexual risk behaviors		0.19	1.97*		0.19	1.84
R^2 change						
Step2 - Step1	.000			.000		
Step3 - Step2	.010			.008		

Note. * $p < .05$, ** $p < .01$, *** $p < .001$